6-4: Graphing $y = ax^2 + bx + c$

So far, we have seen two forms of a quadratic:

1. Standard form:

2. Vertex form:

Inquiry: How do these two forms relate to each other? How can we use this in the real world?

Example 1: Rewrite in standard form.
$y = 3(x + 1)^2 - 4$

The original (vertex form) and answer (standard form) are equivalent equations. This means they deal with the same graph (a parabola). They are also both transformations of the graph of $y = 3x^2$.

Explore: Graph $y = 3(x + 1)^2 - 4$ and the answer from example 1 as well as $y = 3x^2$ in your graphing calculator. How do the graphs compare?

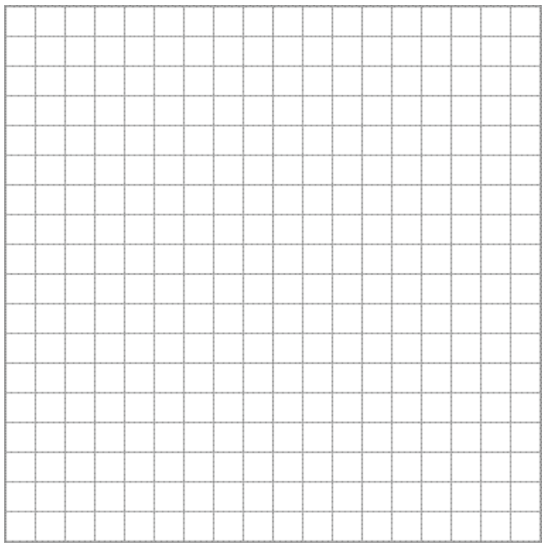
Upon further examination: Let's rewrite our generic vertex form equation into standard form and compare.

Now look back at example 1. Can we find h and k? Why would we want to find h and k?

Example 2: Find the vertex of the parabola for $y = -2x^2 - 12x - 22$.

Newton's Formula:

Example 3: Matt Mitarnowski is on a bridge 22 feet above the water. Suppose he drops a ball over the 3 foot-high railing. Write an equation, graph it, then *estimate* how long it will take to hit the water.



Homework:

"A SHIP IS SAFE IN HARBOR, BUT THAT'S NOT WHAT SHIPS ARE FOR." - UNKNOWN